Customer Installation Guide

Datascope
NetGuard™

mindray™
NORTH AMERICA

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NORTH AMERICA

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Foreword

This installation manual outlines the supported configurations and technical installation instructions for **NetGuard**. It is designed for a technical person that has knowledge about simple networks, Microsoft Server, and basic computer skills.

This publication may have been updated to reflect product design changes and/or manual improvements.

Manual Objective

This manual provides information necessary to install NetGuard. Installation includes planning, specific preparation of the site, and coordination of the cable installation with a Mindray DS USA, Inc. Service Representative.

Warnings, Cautions and Notes

Please read and adhere to all warnings, precautions and notes listed here and in the appropriate areas throughout this manual.

A **WARNING** is provided to alert the user to potential serious outcomes (death, injury, or serious adverse events) to the patient or the user.

A **CAUTION** is provided to alert the user to use special care necessary for the safe and effective use of the device. They may include actions to be taken to avoid effects on patients or users that may not be potentially life threatening or result in serious injury, but about which the user should be aware. Cautions are also provided to alert the user to adverse effects on this device of use or misuse and the care necessary to avoid such effects.

A **NOTE** is provided when additional general information is applicable.

NOTE: Figures in this manual are provided for reference purposes only.

Warnings

WARNING: Only qualified and trained Mindray DS Patient Monitoring Service personnel or those trained by Mindray DS Patient Monitoring Service should attempt to service this equipment. Service is defined as any activity requiring the cover to be removed for internal adjustments, parts replacements, repairs or software upgrades of any kind to ensure compatibility.

WARNING: To ensure compatibility with the operating system and applications software, use only Mindray DS USA, Inc. supplied and/or approved components to repair any part of the NetGuard™ System. Use of unauthorized software, devices, accessories, or cables other than those approved by Mindray DS USA, Inc. may render the application unsuitable for medical patient monitoring. It may also result in increased electromagnetic emissions or decreased Immunity of the system.

WARNING: To adequately display the software application, it is important to maintain a minimum screen resolution of 1024x768 with 96 dpi.

WARNING: Some of the equipment on the NetGuard Network must utilize the hospital emergency power system. Failure to do so will result in loss of monitoring during extended periods of power failure. The back-up power time period for the NetGuard Network is limited.

WARNING: Changes to the NetGuard server configuration and client PC software should not be performed without the guidance of a qualified service representative.

WARNING: Do not use the NetGuard device in an explosive atmosphere or in the presence of flammable anesthetics or gases.

WARNING: If the NetGuard client PC performance is degraded or unresponsive, contact a Mindray DS Patient Monitoring Service Representative immediately.

Cautions

CAUTION: For proper operation use with UL agency approved ethernet cables.

CAUTION: For proper operation, do not use the equipment with a frayed or damaged power cord or ethernet cable.

CAUTION: Do not use a damaged or broken unit or accessory.

CAUTION: For proper operation never place fluids on top of the server. In case of accidental spillage, remove power, wipe clean immediately and have the system serviced to ensure no hazard exists

CAUTION: The server and client PC for this device must only be setup by qualified service personnel.

CAUTION: **Do not block the client PC's speakers. Set the volume levels to ensure that alarms can always be heard.**

CAUTION: **Speaker volume should be set high enough to hear an alarm above ambient noises.**

CAUTION: **To avoid possible interference with other facility devices, use the correct AC cord for all equipment installed on the NetGuard network.**

CAUTION: **It is recommended that password protected screen savers be disabled after the NetGuard client PC software installation. Use of screen savers may degrade the performance of NetGuard software application.**

CAUTION: **It is recommended that the Microsoft® Windows power management features such as power save or hibernation be disabled after the NetGuard client-side software installation.**

CAUTION: **To ensure continuous monitoring, only use hardwired client PCs.**

Phone Numbers and How To Get Assistance

A network of service representatives and factory-trained distributors is available. Prior to requesting service, perform a complete operational check of the instrument to verify proper control settings. If operational problems continue to exist, contact the Service Department at (800) 288-2121, ext. 8116 for Technical Support or (201) 995-7875 for assistance in determining the nearest field service location.

Please include the instrument model number, the serial number, and a description of the problem with all requests for service.

Warranty questions should be directed to a local representative. A list of offices, along with their phone numbers, is provided at the end of this manual.

1.0 System Description

The NetGuard System (shown in FIGURE 1-1) consists of the NetGuard reusable device, NetGuard wireless access point, and the NetGuard server. The access points are hardwired to a PoE switch that transmits the wireless data to the NetGuard server. The NetGuard server sends data to one or more clients running the NetGuard client software.

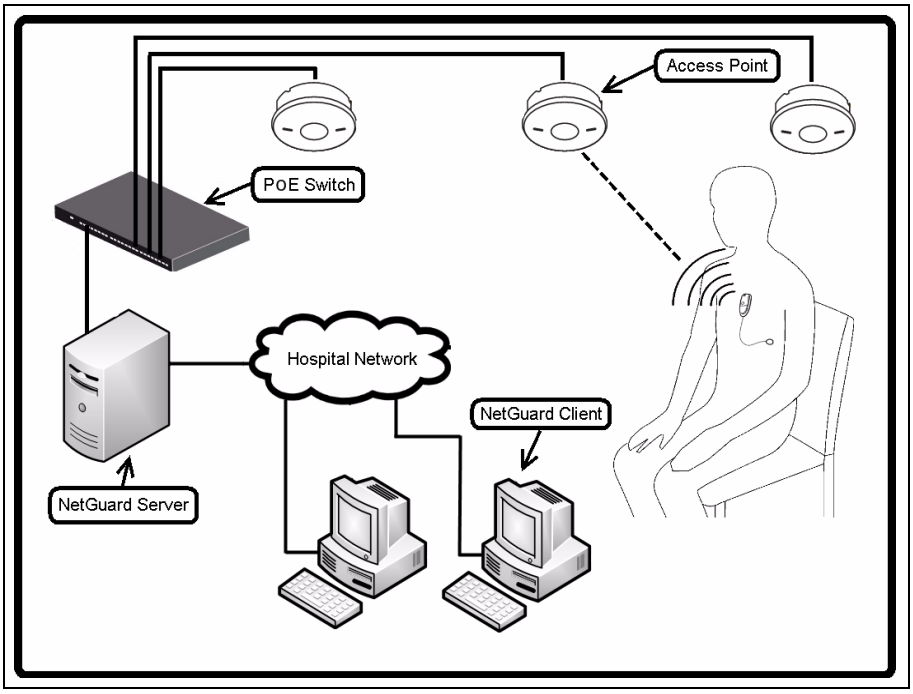

FIGURE 1-1 NetGuard System

1.1 NetGuard System Components

1.1.1 Reusable Device

The reusable device continuously monitors the patient's ECG and heart rate. Patient data and waveform data gets sent if the reusable detects a V-Fib or Asystole alarm, or the server requests a waveform. Device status is wirelessly transmitted to the NetGuard access point using the device's radio transmitter once every second.

NOTE: The reusable device does not contain power.

The reusable device contains a Patient LED and a Status LED.

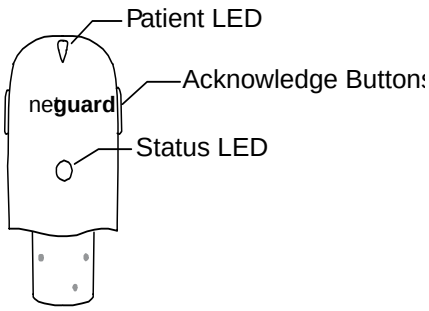

FIGURE 1-2 Reusable Device

The Patient LED indicator illuminates to:

- Indicate the detection of the patient's heart rate
- Alert the clinician that the patient is experiencing a physiological alarm condition

The Status LED indicator illuminates to:

- Indicate the completion of an automatic self-test
- Indicate the battery power available to operate the device
- Indicate the network connection

The reusable device includes a speaker that sounds during a V-Fib or Asystole alarm. There are two buttons located on both sides of the reusable device, and when pressed simultaneously, any active lethal system level alarms are silenced, the patient LEDs are turned off, and an alarm acknowledgement notification transmits to the NetGuard server which silences the alarm notification (visual and audio) at the terminal.

1.1.2 Disposable Battery Pack and Leadset

The disposable includes three electrodes. Two electrodes are in the elongated adhesive patch and the third electrode is attached to the disposable by a lead wire.

NOTE: Refer to the NetGuard Operating Instructions (P/N 0070-00-0678-01) for complete placement instructions.

A battery in the disposable provides power to the reusable. The battery cannot be replaced and should be discarded at the end of the battery life.

NOTE: The patient or care handler does not come in contact with the battery.

NOTE: Disposal of the electrode (disposable) must follow hospital regulations.

1.1.3 NetGuard Access Point

Access points route data between the NetGuard device and the server. The reception range of the access point is dependent on the surrounding environment (e.g. wall construction, etc.). The access point LEDs indicate power via the PoE switch, network connection, and when data packets were received.

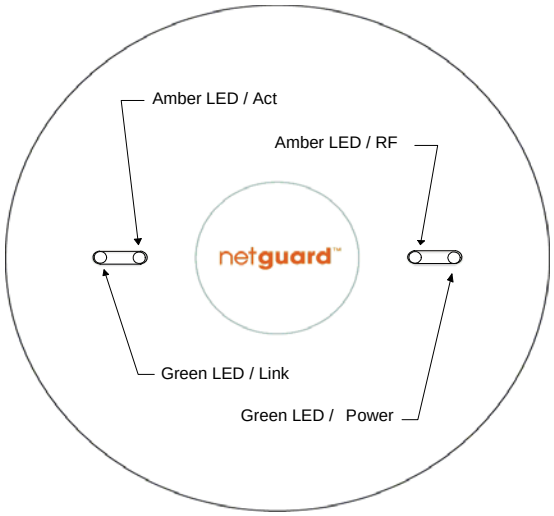

FIGURE 1-3 NetGuard Access Point

Access points communicate with the reusable devices using the ZigBee protocol that is based on the IEEE 802.15.4 standard. The access point transceiver operates in the 2.4 GHz radio band. A maximum of 20 reusables may be associated to one access point at a time. Any device(s) over the 20 device maximum will be forced to search for another access point.

The following access point functions are configurable using Telnet:

- Restore factory defaults
- List current reusables associated
- Retrieve most recent event logs
- View current firmware revision
- Update firmware
- View current configuration
- Configure IP address and subnet mask

NOTE: Access points have no contact with the patient.

1.1.4 NetGuard Server and Switch

The server runs the NetGuard service and pre-requisite software that stores ECG data transmitted from the reusable device, which analyzes and sends the data to the client terminals.

NOTE: The server and switch have no contact with the patient.

1.2 Site Survey

As part of the installation, the service representative receives a scaled floor plan. Mark the floor plan with the coverage area, access point and network component locations, the monitor workstation(s), and cable chase locations, if applicable.

To avoid any potential interference, the service representative uses a Spectrum Analyzer to verify that no other components are running in the same band as NetGuard components.

Using the NetGuard test utility software and transmitter device, the service representative verifies the following:

- Marked floor plan locations are accurate
- There is appropriate coverage without any Comm Loss notifications or low correlation (CORR) values

2.0 *System Requirements and Specifications*

2.1 Server - Minimum Requirements

2.1.1 Hardware

- Processor: 2.8GHz Dual Core processor or 2.0 GHz Quad Core processor
- Memory: 2 GB
- Hard Drive: 70 GB
- Network Interface Cards (NIC): Two available 1Gbps each
- CD/DVD: DVD writer

2.1.2 Software

- Operating System: MS Server 2003, R2 OS, SP2
- .NET Framework 2.0
- Internet Explorer 6.0
- Internet Information Services (IIS 6.0)
- SQL Server 2005, Express/Management Studio or Standard
- NetGuard Server software

NOTE: **Windows updates must be set to manual or managed by hospital IT personnel.**

2.2 Switch - Minimum Requirements

- Enough available 100 Mb ports for all NetGuard Access Points and the NetGuard Server
- PoE (power over Ethernet) capable
- Must accept RJ 45 connectors

2.3 Client PC - Minimum Requirements

2.3.1 PC Hardware

- Processor: Pentium 4, 2 GHz processor or greater
- Memory: 768 MB RAM available for NetGuard, not including OS required RAM
- Capabilities:
  - Play .wav audio files
  - Display 1024 x 768 resolution video at 96 dpi
- Hard disk space available: 55 MB

2.3.2 PC Software

- Operating System: Windows XP Pro, SP2
- Internet Explorer 6.0
- .NET 2.0
- NetGuard Client software

NOTE: Windows updates must be set to manual or managed by hospital IT personnel.

2.4 Mounting Rack (if applicable)

Wall mount or existing 19" rack.

2.5 Cabling

Refer to the Agency Compliance table on page 2-3.

2.6 Cable Connectors

RJ-45 CAT5 connectors are used at each end of the CAT5 cable to allow connections between the access point and client PCs to the network switch and server.

2.7 Power Requirements

The server, PC, and switch are powered by the AC line cords supplied by the component manufacturer. Upon purchase of the components, the user will specify the appropriate power for their geographic location.

Mindray DS USA, Inc. requests that the AC power is connected to a UPS and to the facilities' emergency power system.

2.8 Agency Compliance

Server:	IEC60950, Information Technology Equipment - Safety - Part 1 General Requirements
Client Terminal:	IEC60950, Information Technology Equipment - Safety - Part 1 General Requirements
Access Point:	IEC60950, Information Technology Equipment - Safety - Part 1 General Requirements
Patient Device:	IEC60950, Information Technology Equipment - Safety - Part 1 General Requirements
Cable:	**NEC/UL Classification:** CMP (Reference: UL Standard 444 / CSA C22.2: Multi-National Harmonized Communication Cable Standards CSA c22.2 No. 214-94 and UL 444)
	CEC/cUL Classification: CMP (Reference: UL Standard 444 / CSA C22.2: Multi-National Harmonized Communication Cable Standards CSA C22.2 No 214-94 and UL 444)
	CSA Flame Test Classification: FT6
	IEC Specification: 11801 Category 5
	ANSI/TIA/EIA Specification: 568-B.2 Category 5e (CAT 5e)
Cable connectors:	Complies with ISO 9001:2000

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3.0 *Installation*

This chapter outlines a list of required tasks and indicates the responsibilities of the hospital and Mindray DS USA, Inc. Completing preparations in advance facilitates a timely installation.

NOTE: Please refer to the Warnings, Precautions and Notes in the "Foreword" section of this manual prior to use.

3.1 Procedure for Installation

3.1.1 Installation Schedule and Responsibilities

The following schedule serves as a guideline for planning the NetGuard System installation.

TASK	RESPONSIBILITY
Provide hospital floor plans	**Hospital**
Provide quote for system	Mindray DS USA, Inc.
Issue P.O. to purchase system	**Hospital**
Order system and provide estimated delivery date	Mindray DS USA, Inc.
Plan installation and establish hospital requirements	**Hospital**
Complete site survey	Mindray DS USA, Inc.
Provide installation guidelines to customer	Mindray DS USA, Inc.
Review site survey, installation guidelines and delivery information	**Hospital**
Order required installation components	**Hospital**
Review site survey and installation guidelines	**Hospital**
Consult with Mindray DS USA, Inc. regarding installation, if necessary	**Hospital**/Mindray DS USA, Inc.
Schedule completion of all hospital requirements	**Hospital**
Arrange for CAT5 cable installation and certification	**Hospital**
Complete all required electrical work: AC outlets, etc., carpentry, rack, and nurses' station renovation, if necessary	**Hospital**

TASK	RESPONSIBILITY
Review equipment delivery date and advise Mindray DS USA, Inc. of any delays in satisfying hospital requirements	**Hospital**
Install and test system	Mindray DS USA, Inc.
Accept the system installation	**Hospital**

3.1.2 Exclusions

Mindray DS USA, Inc. is not responsible for installing wall mounts or AC electrical wiring. The hospital or facility is responsible for the installed equipment.

3.2 Installation Types

3.2.1 Introduction

The NetGuard System can be setup using multiple network topologies. Each topology has advantages and disadvantages. The hospital IT department determines the topology type prior to the installation. FIGURE 3-1 is an example of a possible topology.

3.2.2 General Description

The NetGuard System consists of three components: the patient device, network, and the client terminal.

3.2.3 Patient Device

The reusable device continuously monitors the patient's ECG and heart rate. Patient data and waveform data gets sent if the reusable detects a V-Fib or Asystole alarm, or the server requests a waveform device status are wirelessly transmitted to the NetGuard access point using the device's radio transmitter once every second.

The reusable device includes a speaker that sounds during a V-Fib or Asystole alarm. There are two buttons located on both sides of the reusable device and when pressed simultaneously, any active lethal System level alarms are silenced, the patient LEDs are turned off, and an alarm acknowledgement notification is transmitted to the NetGuard server which silences the alarm notification (visual and audio) at the terminal.

The disposable includes three electrodes. Two electrodes are in the elongated adhesive patch and the third electrode is attached to the disposable by a lead wire.

NOTE: The reusable device does not contain power.

A battery in the disposable provides power to the reusable. The battery cannot be replaced and should be discarded at the end of the battery life.

NOTE: The disposable battery is encapsulated by a hard plastic and does not come in contact with the patient or care handler.

NOTE: The disposable is not a serviceable item. Disposal of the electrode (disposable) and battery must comply with hospital regulations.

3.2.4 Client PC

The client PC is the computer located at the nurses' station that runs the NetGuard client software.

NOTE: All components of the network rack and client terminal must be connected to an AC outlet (20 amp) that is fully connected to the facilities emergency power system. Position the AC outlet within 6 ft (1.8m) of the network rack and client terminal.

3.2.5 Cable Requirements

The Ethernet (CAT5) cable lengths are critical in the NetGuard System. The CAT5 cable length must not exceed 328 ft. (100 meters) on any cable run and must be routed away from fluorescent lighting fixtures and other electrical devices such as AC motors, heaters, etc. If cabling must extend past the 328 ft. (100 meters) distance, use another switch (must be PoE for access point) or run fiber.

3.2.6 System Installation Types

The NetGuard System can be setup using multiple network topologies. Each topology has advantages and disadvantages. The hospital IT department determines the topology type prior to the installation. FIGURE 3-1 is an example of a possible topology.

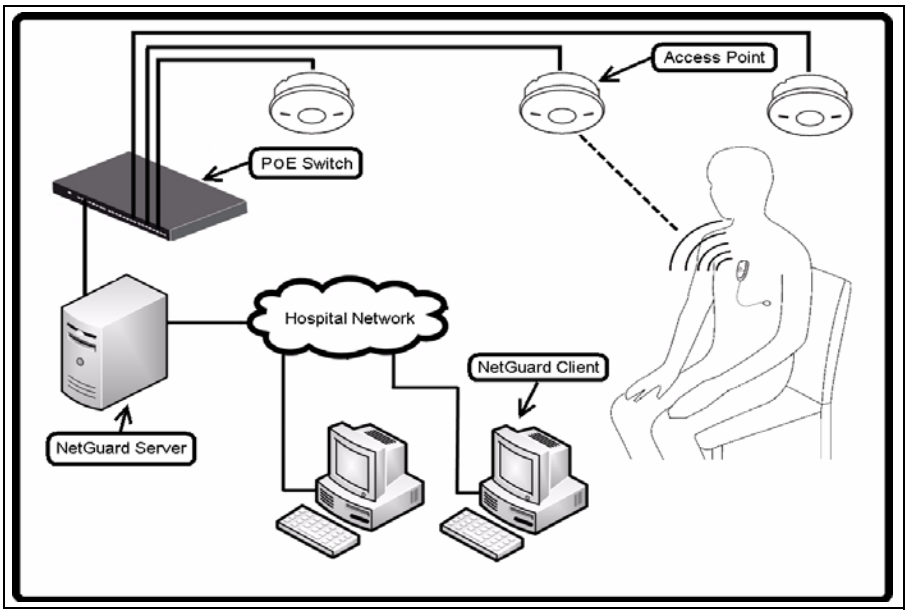

FIGURE 3-1 Example NetGuard System as a part closed/part hospital network

FIGURE 3-1 shows network topology of the NetGuard System as a part closed/part hospital network. Patient data is transmitted from the NetGuard reusable wirelessly to the access point. The access points and first network interface card (NIC) of the NetGuard server are connected to an unmanaged PoE switch. The second NIC of the NetGuard Server is configured and connected to the same hospital network as are the NetGuard terminals. The vertical cabling between the NetGuard Server and the switch connecting the terminals should be at minimum 1Gbit. The horizontal cabling to NetGuard terminals should be connected at minimum 1Gbit.

3.3 Preparation of the Network Components

3.3.1 Server Installation

1. If not already completed, install the software in the following order:

- MS Server 2003, R2 OS, SP2
- Install .NET Framework 2.0
  (access from the Microsoft Download Center)
- Install Internet Information Services (IIS 6.0) (shipped as advanced tools in the operating system)
- SQL Server 2005

NOTE: **Install the NetGuard server software after installing the database.**

NOTE: **Refer to the Microsoft website for download information.**

NOTE: **If installing or repairing .NET Framework causes IIS to lose its ASP.NET mappings, go to the following link to learn how to restore these mappings:**

http://support.microsoft.com

2. Insert the CD into the disc drive and follow the Install Wizard prompts.

- When prompted, enter "NetGuard" as the server name.
- The Mindray DS USA, Inc. service representative needs to enter the access point MAC addresses and IP addresses.

NOTE: **Enter these addresses in the NetGuard Installation Verification Document for future reference. Leave a copy of this form with the hospital.**

- Once the server installation is complete, label the server as the "NetGuard Server" for future reference. The client installation requires the server name.

3.3.2 NetGuard Client Installation

1. Insert the CD into the disc drive and follow the Install Wizard prompts.

2. When prompted, enter the server name.

3. Optional - after installation is complete, access the Internet and enter the Administrative Login page.

4. Complete the administrative setup, as described in the ''NetGuard Home Page'' on page 3-7.

3.3.3 Administrative Setup

3.3.3.1 Administrative Log In

- Login to the Administrative website. Upon correct login, the screen advances to the Home Page.

3.3.3.2 NetGuard Home Page

The NetGuard Home Page includes a series of hypertext links which provide access to the following administrative functions:

HYPERTEXT LINK	FUNCTION
User Management	Setup the users, passwords, their role, and access to monitor groups
Room Management	Setup the room names and bed numbers
Monitor Group Management	Setup the department groups or more clearly define functions within a group
Alarm Management	Setup the System Level alarms and Patient Level alarm thresholds. Also provides access to ECG waveform print function.
Database Management	Setup for removal of discharged patients from the database after a defined number of days.
Network Management	Programs the patient transmitter MAC address, the access point MAC address, and IP Address.
Logo Settings	Uploads the NetGuard client application logo.

3.4 Testing the System

After installing the NetGuard client software and completing the administrative setup, the NetGuard System is ready for testing. To verify that the system is working properly, the service representative attaches a NetGuard device to a patient simulator and walks within the designated site area to ensure that the device is communicating with the system.

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